

Amendments to the Specification

Please replace the paragraph beginning on page 13, line 18 with the following amended paragraph:

[[Fig. 4 illustrates]] Figs. 4 and 4A illustrate a learning process to pick the best set of example images to be used in Fig. 3A;

Please replace the paragraph beginning on page 13, line 18 with the following amended paragraph:

Once the basic inspection plan is generated, processing proceeds to step 56 which corresponds to a board-specific learning step in which the information in the basic inspection plan is augmented. This board-specific learning process relates the known part information in the plan, such as geometric information, to its observed visual characteristics. This learning process is more fully described in conjunction with Figures 3, 3A, 4, 4A, and 14 below. Steps 50-56 above thus correspond to a set-up and learn procedure which takes place before an inspection step is performed.

Please replace the paragraph beginning on pages 26, line 16 with the following amended paragraph:

Figs. 3, 3A, ~~and 4~~, and 4A describe elements of a learning process. The models may need to be trained on board specific images. For one part type, the models need to see examples of: (1) a tightly cropped image of the part without any surround rotated to the correct orientation, (2) the part, on paste, with its surround (known as the "place" image), (3) examples of pasted pads and the surround without the part (known as the "paste" image), (4) examples of bare pads and the surround without the part (known as the "bare" image). Therefore, in one particular embodiment, the minimum number of example images that are required to train the models for a part is four. In some applications, however, the minimum number of examples can be less than four. For example, in some applications, (e.g. some printed circuit board inspection applications, the bare board has been found to be unimportant. Preferably images (2)-(4) above are from the same reference designator (i.e. from the same part at the same location on a PCB) and image (1) is from a different reference designator (i.e. from the same part at a different location on the PCB than examples (2) -(4)). Image (1) may

also be captured independently by a non-board specific technique (e.g. it can be imaged alone without a board).

Please replace the paragraph beginning on page 30, line 4 with the following amended paragraph:

Referring now to Fig. 3A describes the learn process for the image in the structural model. Processing begins in step 90 in which the structural and image models are imported and applied to cropped, paste, placed and bare example ROIs. It should be noted that in the process flow of Fig. 3A, the images are randomly selected. In some applications, however, it may be desirable to select the best set of example images to be used in the learn process. Such a technique will be described below in conjunction with ~~Fig-4~~ Figs. 4 and 4A.

Please replace the paragraph beginning on page 31, line 26 with the following amended paragraph:

Thus, referring now to ~~Fig-4~~ Figs. 4 and 4A the steps which could be performed if it were desired to select the best cropped, paste, placed and bare images to use in the learn process described above in conjunction with Fig. 3A are shown.

Please replace the paragraph beginning on page 33, line 19 with the following amended paragraph:

It should be understood that ~~Fig-4~~ Figs. 4 and 4A, ~~describes~~ describe a scenario in which only a single trio of images (one example of a bare, paste and placed image) are used for training. The other N-1 images are used for testing to determine or gauge how well the models work. It should be appreciated, however, that in some applications more than one reference designator could be used for training in step 104 and therefore it would be desirable to select the best set or sets of reference designators which give the models the best discrimination ability over the test set (i.e. whatever is left).

Please replace the paragraph beginning on page 38, line 18 with the following amended paragraph:

It is possible via the learn and debug that an alternate image or structural model has been specified. If this is the case, at the appropriate time, both would be applied. If either matched, the process would continue as specified in ~~Figure 4~~ Figs. 4 and 4A.

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